

Finding Solutions by Working Backwards

Directions: Using the information on page 13, solve the problems below and on pages 15 and 16. Some of the problems provide hints to help you solve them.

Grace has to be at work by 9:00 A.M. It takes her 15 minutes to get dressed, 20 minutes to eat, and 35 minutes to walk to work. What time should she get up?

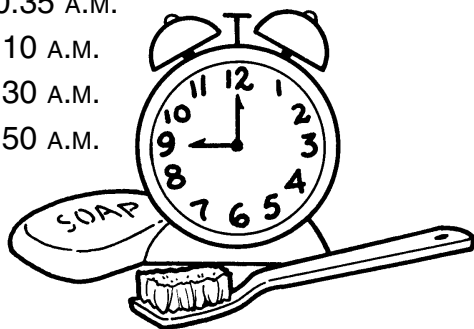
- What does the problem ask you to find?
 - what's the total time it takes her to get ready
 - how far away is work
 - what time does she have to be at work
 - what time should she get up
- What information is needed to solve the problem?
 - what time does she get to work
 - what's the sum of $(15 + 20 + 35)$ minutes
 - what's the difference between 9:00 A.M. and the sum of $(15 + 20 + 35)$ minutes
 - what's the total sum of 9:00 A.M. and the sum of $(15 + 20 + 35)$ minutes

- How can you show the problem with numbers?

Hint: Write a problem that shows working backward from 9:00 A.M. by subtracting the time Grace spent doing other activities to calculate what time she got up.

- What is your answer?

- 10:35 A.M.
- 8:10 A.M.
- 7:30 A.M.
- 7:50 A.M.



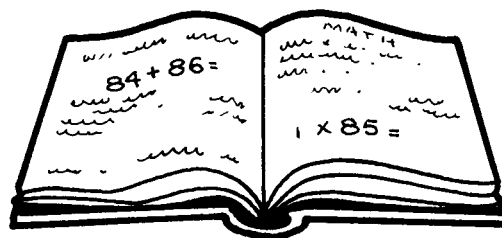
Mr. Hall asked his students to open their math books to the facing pages whose page numbers add up to 85. To which pages should the children turn?

- What does the problem ask you to find?
 - what is page 85
 - how to open the math book to facing pages
 - what are the facing pages whose page numbers add up to 85
 - how many students opened their books to page 85
- What information is needed to solve the problem?
 - how many tries will it take to get 85
 - what is 1×85
 - what is $84 + 86$
 - what is about half of 85
- How can you show the problem with numbers?

Hint: You know the total already. The numbers of two facing pages that total 85 must be around half. Try dividing by two, but remember that page numbers are whole numbers that increase from lowest to highest.

- What is your answer?

- $84 + 86$
- $40 + 45$
- $41 + 44$
- $42 + 43$



Kyle played the same game with Mr. Hall. "I'm thinking of two facing pages that total 127, Mr. Hall," he said. Kyle is thinking of which two facing pages?

9. What does the problem ask you to find?
 - a. what totals 127
 - b. what game are Kyle and Mr. Hall playing
 - c. what is half of 127
 - d. what are the page numbers of two facing pages that add up to 127
10. What information is needed to solve the problem?
 - e. how many tries will it take to get 127
 - f. what is 1×127
 - g. what is $126 + 128$
 - h. what is about half of 127
11. How can you show the problem with numbers?
 - i. $127 - 1 =$
 - j. $(127 - 1) + (127 + 1) =$
 - k. $127 \div 2 =$
 - l. $127 \times 2 =$
12. What is your answer?
 - m. $62 + 63$
 - n. $63 + 64$
 - o. $65 + 66$
 - p. $64 + 65$

Felicia passed around a basket of strawberries to the girls at her party. Before the party she ate 5 strawberries and gave a friend 3. Then 8 girls arrived at the party. The first girl took a strawberry, the second girl took 3 strawberries, the third girl took 5 strawberries and so on. After the last girl took her strawberries, the basket was empty. How many strawberries were in the basket at the beginning?

13. What does the problem ask you to find?
 - a. how many strawberries each girl ate
 - b. how many strawberries were in the basket at the beginning
 - c. how many strawberries were eaten before the party
 - d. how many girls were at the party
14. What information is needed to solve the problem?

Hint: You need to find the total when eight girls were taking two more strawberries than the previous girl each time. Then you can add back in the 8 that were taken before the party.

15. How can you show the problem with numbers?
 - e. $8 \times 8 =$
 - f. $(1 + 3 + 5) \times 8 =$
 - g. $8 \times 2 + 8 =$
 - h. $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + (3 + 5) =$
16. What is your answer?
 - i. 128
 - j. 64
 - k. 72
 - l. 17

In Wisconsin the Washington Island, ferryboat is full when it has 10 cars on board. It is also full when it has six trucks on board. The ferryboat never carries cars and trucks at the same time.

The ferryboat made five trips across the channel and was full on each trip. It ferried a total of 42 cars and trucks across.

How many cars did the ferryboat carry altogether in the five trips?

17. What does the problem ask you to find?
 - a. how many cars and trucks went across
 - b. how many cars and trucks can the ferryboat take at the same time
 - c. how many trucks went in five trips
 - d. how many cars went in five trips
18. What information is needed to solve the problem?
 - e. how many trucks went across in how many trips
 - f. how many trucks can go in five trips
 - g. what's the difference between 50 cars and 30 trucks
 - h. why doesn't the ferry carry cars and trucks at the same time
19. How can you show the problem with numbers?
 - i. $30 \text{ cars} + 12 \text{ trucks}$
 - j. $(5 \times 6 \text{ cars}) + (6 \times 12 \text{ trucks})$
 - k. $5 \times 10 \text{ cars}$
 - l. $32 \text{ cars} + 10 \text{ trucks}$
20. What is your answer?
 - m. 50 cars
 - n. 12 cars
 - o. 30 cars
 - p. 42 cars

